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Jun 27, 1995

US-PAT-NO: 5427797

DOCUMENT-IDENTIFIER: US 5427797 A

TITLE: Systemic effects of nitric oxide inhalation

DATE-ISSUED: June 27, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Frostell; Claes G.	Vallingby			SE
Hedenstierna; Goran	Djursholm			SE
Hogman; Marieann E.	Alunda			SE
Loscalzo; Joseph	Dedham	MA		
<u>Stamler; Jonathan S.</u>	Boston	MA		

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FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
92/10228	June 1992	WO	

OTHER PUBLICATIONS

"Inhaled Nitric Oxide Reverses Hypoxic Vasoconstriction in Lambs and Humans", Biol. Nitric Oxide, Proc. Int. Meet., 2nd, Meeting Date 1991, vol. 1, 363-4 1992.

ART-UNIT: 152

PRIMARY-EXAMINER: Page; Thurman K.

ASSISTANT-EXAMINER: Azpuru; Carlos

ATTY-AGENT-FIRM: Herron; Charles J. Olstein; Elliot M.



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Respiratory Distress Syndrome, Adult

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Last Updated: March 19, 2003

Synonyms and related keywords: adult respiratory distress syndrome, ARDS, severe acute respiratory syndrome, SARS

AUTHOR INFORMATION

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Medicine, Harvard Medical School, and Robert C. Conner, MD, MPH, Associate Professor, Thomas Jefferson University; Program Director, Department of Emergency Medicine, Christiana Care Health System

INTRODUCTION

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Background: Adult respiratory distress syndrome (ARDS) is a diffuse pulmonary parenchymal injury associated with noncardiogenic pulmonary edema and resulting in severe respiratory distress and hypoxemic respiratory failure. The pathologic hallmark is diffuse alveolar damage (DAD), but lung tissue rarely is available for a pathologic diagnosis. Therefore, diagnosis is made on clinical grounds, according to the following criteria set forth by the American-European Consensus Conference:

- Acute onset
- Bilateral infiltrates
- Pulmonary artery wedge pressure less than 19 mm Hg (or no clinical signs of congestive heart failure)
- $\text{PaO}_2/\text{FIO}_2$ ratio less than 200 (ARDS) or less than 300 (acute lung injury [ALI]): ALI is a milder clinical expression of the injury of ARDS that may or may not progress to ARDS.

Pathophysiology: DAD results in loss of the integrity of the alveolar-capillary barrier, transudation of protein-rich fluid across the barrier, pulmonary edema, and hypoxemia from intrapulmonary shunting. ARDS has a diversity of predisposing conditions, including direct pulmonary injury (eg, pulmonary infection or aspiration) and indirect injury (eg, sepsis, pancreatitis, multiple trauma). Frequently, ARDS develops in association with other organ dysfunction, in which case it is part of the multiple organ dysfunction syndrome (MODS).

The exact mechanism by which the predisposing condition results in DAD is not known fully, but most likely it is mediated, at least in part, by reactive oxygen radicals and proteolytic enzymes from neutrophils. Other mechanisms mediated by cytokines, complement, or endotoxin also may be involved.

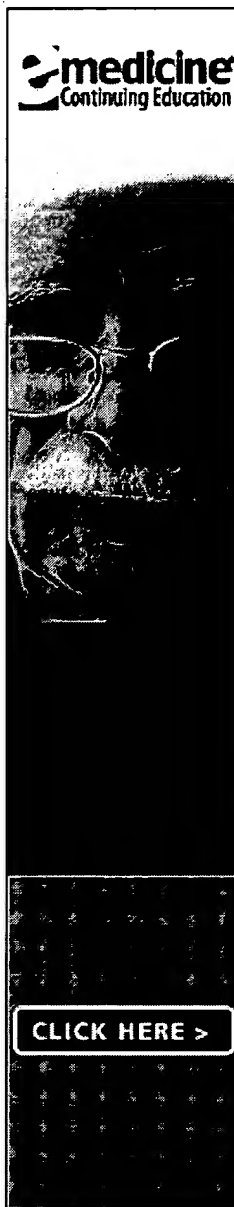
The following 3 phases in the pathogenesis of ARDS have been described:

- Exudative phase is the initial phase, with injury to the endothelium and epithelium, inflammation, and fluid exudation.
- Fibroproliferative phase follows the exudative phase and is characterized by the influx and proliferation of fibroblasts and other cellular elements. In this phase, injury may begin to resolve or become persistent.
- In those who recover, the fibrosis phase of healing is marked by resolution of inflammation and development of varying degrees of pulmonary fibrosis.

Frequency:

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- **In the US:** Incidence of ARDS is hard to quantify because of its varying definitions in epidemiological studies. Estimated incidence in the US is 150,000-200,000 cases per year. Most cases occur following admission to the hospital. Patients presenting to the ED with ARDS are rare. However, patients with direct pulmonary injury such as pulmonary aspiration, toxic inhalation, or blunt thoracic trauma may develop ARDS during their stay in the ED.

Mortality/Morbidity:

- Overall risk of mortality is reported to be 40-70%, with prospective studies demonstrating an average of about 60%. Most survivors have few long-term sequelae. Survivors of severe cases may have persistent pulmonary fibrosis with symptoms of restrictive lung disease.
- Factors that influence mortality rate include age (higher rate in those older than 65 y) and coexisting organ failure (higher rate with increasing number of concomitantly failing organs).

Age: No age predilection exists. ARDS can occur in children as well as in adults. Incidence may be higher in adults because of a higher incidence of predisposing conditions (eg, major trauma, sepsis, pancreatitis).

CLINICAL

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History:

- ARDS can follow a variety of pulmonary or nonpulmonary insults, and the presence of such factors should alert physicians to the potential for development of ARDS.
- Onset of symptoms in ARDS can follow the predisposing condition from 4 hours to several days; thus, the timing of symptom onset may vary greatly.
- Dyspnea is present in all cases except those in which alteration in sensorium is present.
- Other symptoms, if present, typically are related to the predisposing condition.

Physical: Findings on physical examination are not specific for ARDS and can be found in pulmonary edema of any cause.

- Labored breathing and tachypnea (almost universally present)
- Cyanosis and moist skin
- Tachycardia
- Hyperventilation
- Scattered crackles
- Increased work of breathing

- Agitation
- Lethargy followed by obtundation

Causes:

- Many conditions have been found to precipitate ARDS. In some cases a predisposing condition cannot be identified. The following is a partial list of the most common predisposing conditions:
 - Infection - Pneumonia of any etiology (especially viral) and systemic sepsis (especially gram negative)
 - Shock - Any type, particularly septic and traumatic shock
 - Aspiration - Gastric contents, near drowning, and toxic inhalation
 - Trauma - Pulmonary contusion, fat embolization, and multiple trauma
 - Other - Systemic inflammatory response syndrome, pancreatitis, postcardiopulmonary bypass, massive blood transfusion, drug ingestion (eg, heroin, methadone, barbiturates, salicylates)

DIFFERENTIALS

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Congestive Heart Failure and Pulmonary Edema

Pneumonia, Aspiration

Pneumonia, Bacterial

Pneumonia, Immunocompromised

Pneumonia, Viral

Smoke Inhalation

Other Problems to be Considered:

Cardiogenic pulmonary edema

WORKUP

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Lab Studies:

- Arterial blood gases analysis (ABGs) is the most important laboratory test and allows detection and documentation of hypoxemia.
 - Hypocapnia is a typical finding early in ARDS, but hypercapnia can be seen later

as ventilatory failure progresses.

- PaO_2 less than 50 mm Hg with an FIO_2 more than 0.6
- Other laboratory studies are nonspecific and are obtained as indicated by the underlying or predisposing conditions.

Imaging Studies:

- The chest radiograph reveals characteristic diffuse alveolar-interstitial infiltrates in all lung fields.
 - In early cases, the radiographic findings may not be fully developed.
 - Additional localized pulmonary findings may be present if the predisposing condition involves a pulmonary process.
- Chest CT may be helpful in advanced cases but is not necessary for diagnosis.
- Echocardiography may be helpful to exclude a cardiogenic etiology for pulmonary edema.

Procedures:

- Sputum should be collected for Gram stain and cultures (eg, bacterial, fungal, viral) if a pulmonary infection is present. These are best obtained from the lower respiratory tract shortly after endotracheal (ET) intubation.
- Bronchoscopy with bronchoalveolar lavage may be helpful to identify occult pulmonary infection but is usually performed in the ICU.
- A pulmonary artery catheter may be helpful to exclude cardiogenic causes but usually is placed in the ICU.

TREATMENT

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Prehospital Care:

- Prehospital care should focus on the ABCs of life support, particularly with rapidly developing cases.
- Institute pulse oximetry and manage hypoxemia with supplemental oxygen.
- ET intubation is indicated for refractory hypoxemia or marked respiratory distress.

Emergency Department Care:

- Airway and support of ventilation and oxygenation are the initial priorities of

management. Perform ET intubation for hypoxemia refractory to supplemental oxygen or for clinical signs of respiratory failure.

- Mechanical ventilation with positive end-expiratory pressure (PEEP) of 5-10 cm H₂O is effective in reducing intrapulmonary shunting and improving oxygenation.
 - Initiate with an FIO₂ of 1 and decrease only while monitoring pulse oximetry, maintaining the oxygen saturation at 92-94%.
 - Select an initial tidal volume of 8-10 mL/kg and respiratory rate of 10/minute.
 - Pressure-controlled ventilation offers several advantages over volume-controlled modes.
 - Hypercapnia alone on these settings should not prompt an increase in ventilator settings unless pH is less than 7.1 (permissive hypercapnia).
- Monitor vital signs frequently, especially with mechanical ventilation, since marked decreases in venous return can result with subsequent impairment of cardiovascular function.
- An intravenous (IV) line should be available at all times for fluid and/or medication administration.
- Avoid excessive fluid administration. Use only what is necessary to treat signs of intravascular volume depletion or hypotension.
- Treat the underlying etiology.

Consultations: Obtain critical care consultation for hypoxemia or hypercapnia that persists despite mechanical ventilation or hemodynamic instability refractory to therapy.

MEDICATION

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As of yet, no medication has been shown to affect the pulmonary inflammatory process of ARDS directly. Late cases with a persistent fibroproliferative phase may respond to steroids, but these cases are not seen in the ED. Administer antibiotics following appropriate cultures in cases of pulmonary or extrapulmonary infection leading to ARDS. The mainstays of therapy are cardiopulmonary support and treatment/eradication of the underlying or predisposing conditions. Cardiovascular instability despite fluid administration is managed with catecholamines, such as dopamine and/or dobutamine.

FOLLOW-UP

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Further Inpatient Care:

- Admit all patients to the ICU. Patients with early ARDS with mild pulmonary findings may deteriorate rapidly.

Complications:

- Multiple organ failure
- Death
- Permanent lung disease
- Oxygen toxicity
- Barotrauma
- Superinfection

Prognosis:

- Mortality rate averages 60%.
- Nonsurvivors usually die from sepsis or multiple organ failure.
- Survivors usually have a good outcome with minimal, if any, persistent pulmonary symptoms.
- Survivors of severe cases may have some degree of permanent pulmonary fibrosis and symptoms of restrictive lung disease.

MISCELLANEOUS

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Medical/Legal Pitfalls:

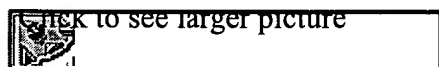
- Failure to recognize patient's risk for rapid progression of respiratory failure

PICTURES

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Caption: Picture 1. Chest radiograph of a patient with adult respiratory distress syndrome (ARDS).

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Picture Type: X-RAY

Caption: Picture 2. Histologic section of the lung showing diffuse alveolar damage in adult respiratory distress syndrome (ARDS).

[View Full Size Image](#)[eMedicine Zoom View \(Interactive!\)](#)

Picture Type: Photo

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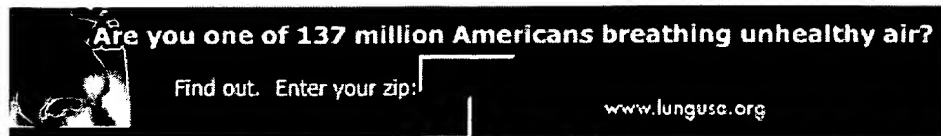
- Bidani A, Tzouanakis AE, Cardenas VJ Jr, Zwischenberger JB: Permissive hypercapnia in acute respiratory failure. JAMA 1994 Sep 28; 272(12): 957-62[[Medline](#)].
- Dantzker DR, Brook CJ, Dehart P, et al: Ventilation-perfusion distributions in the adult respiratory distress syndrome. Am Rev Respir Dis 1979 Nov; 120(5): 1039-52[[Medline](#)].
- Fowler AA, Hamman RF, Good JT, et al: Adult respiratory distress syndrome: risk with common predispositions. Ann Intern Med 1983 May; 98(5 Pt 1): 593-7[[Medline](#)].
- Kollef MH, Schuster DP: The acute respiratory distress syndrome. N Engl J Med 1995 Jan 5; 332(1): 27-37[[Medline](#)].
- Repine JE: Scientific perspectives on adult respiratory distress syndrome. Lancet 1992 Feb 22; 339(8791): 466-9[[Medline](#)].
- Rinaldo JE, Rogers RM: Adult respiratory-distress syndrome: changing concepts of lung injury and repair. N Engl J Med 1982 Apr 15; 306(15): 900-9[[Medline](#)].
- Schuster DP: What is acute lung injury? What is ARDS? Chest 1995 Jun; 107(6): 1721-6[[Medline](#)].

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American Lung Association® Fact Sheet: Adult (Acute) Respiratory Distress Syndrome (ARDS)

December 23, 2003

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November 2003

Adult (acute) respiratory distress syndrome (ARDS) is the rapid onset of progressive malfunction of the lungs, usually associated with the malfunction of other organs due to the inability to take up oxygen. The condition is associated with extensive lung inflammation and small blood vessel injury in all affected organs.

ARDS has a fatality rate of approximately 40 percent despite supportive therapy, including mechanical ventilators and supplement oxygen. New advances in mechanical ventilation are taking place. In a recent NHLBI study preliminary results suggested that receiving small, rather than large, breaths of air from a mechanical ventilator reduced the number of deaths by 22 percent.

The incidence of ARDS has been difficult to determine partly due to the variety of causes but it is a common problem in hospital intensive care units. Various published estimates have ranged from 1.5 to 75 cases per 100,000 populations. Earlier estimates suggested that approximately 150,000 Americans are affected each year.

ARDS is commonly precipitated by trauma, sepsis (systemic infection), diffuse pneumonia and shock. It may be associated with extensive surgery, and certain blood abnormalities. Less common causes include drowning and inhalation of toxic gases. In half the cases, onset occurs within 24 hours of the original illness or injury; in nearly all, it occurs within three days.

Treatment for ARDS consists of mechanical ventilation along with careful attention to fluid balance and a supportive breathing technique called positive end expiratory pressure (PEEP). These are combined with continuing treatment of the precipitating illness or

injury.

A study found that survivors of ARDS may have persistent functional disability one year after discharge from the intensive care unit, most commonly muscle wasting and weakness.

There are many experimental therapies that show promise for the treatment of ARDS. These include replacement surfactant (a natural soapy substance that keeps the lung air sacs open) and the use of anti inflammatory agents.

For more information call the American Lung Association at 1-800-LUNG-USA (1-800-586-4872), or visit our web site at www.lungusa.org.

Research supported by ALA has contributed significantly to scientific progress in understanding and treating respiratory disorders of infants and children.

- [View projects funded by the American Lung Association on 'Disorders of the Lung's Blood Vessels and Acute Lung Injury' for 2002-2003.](#)

Related links on the Web

These sites are not part of The American Lung Association web site, and we have no control over their content or availability.

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[The ARDS Support Center](#)

[The Pulmonary Paper](#)

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L27 9 (L15 OR L23) AND (VASODILAT? OR NITROVASODILAT?)

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=> s l28 not (l26 or l17)
L29 8 L28 NOT (L26 OR L17)

=> d 1-8 bib ab

L29 ANSWER 1 OF 8 CAPLUS COPYRIGHT 2002 ACS
AN 2001:695475 CAPLUS
DN 136:245117
TI Nitric oxide and DNA damage
AU Coban, Ahmet Yilmaz; Durupinar, Belma
CS Tip Fakultesi Mikrobiyoloji ve Klinik Mikrobiyoloji Anabilim Dalı, Ondokuz
Mayis Universitesi, Turk.
SO Mikrobiyoloji Bulteni (2001), 35(3), 497-504
CODEN: MIBUBI; ISSN: 0374-9096
PB Ankara Mikrobiyoloji Dernegi
DT Journal; General Review
LA Turkish
AB A review. Nitric oxide (NO) which is a very popular mol. in recent years,
is a sol., free radical gas. NO is secreted by several cells such as
endothelial cells, macrophages and some special brain neurons, and
synthesized by the help of nitric oxide synthase enzyme from L-arginine,
mol. oxygen and NADPH. There are various effects of NO on the organ and
immune systems of the host, including **vasodilation**, platelet
aggregation and adhesion, and macrophage derived form of NO exerts some
cytotoxic effects on some microorganisms and tumor cells. NO is produced
in high concns. during chronic inflammation and after being transformed to
nitrogen dioxide, **dinitrogen trioxide** and nitrite in
the presence of mol. oxygen, it produces important genomic damage such as
base pair replacement mutations and breaks in the DNA helix. In this
review article, the characteristics, mechanisms of synthesis and the
functions of nitric oxide has been reviewed and the effects of NO on DNA
have been discussed under the light of literature.

L29 ANSWER 2 OF 8 CAPLUS COPYRIGHT 2002 ACS
AN 2000:495089 CAPLUS
DN 133:188313
TI Inhibitory effects of nitric oxide and nitrosative stress on
dopamine-.beta.-hydroxylase
AU Zhou, Xiaoling; Espey, Michael G.; Chen, James X.; Hofseth, Lorne J.;
Miranda, Katrina M.; Hussain, S. Perwez; Wink, David A.; Harris, Curtis C.
CS Laboratory of Human Carcinogenesis, NCI, National Institutes of Health,
Bethesda, MD, 20892, USA
SO Journal of Biological Chemistry (2000), 275(28), 21241-21246
CODEN: JBCHA3; ISSN: 0021-9258
PB American Society for Biochemistry and Molecular Biology
DT Journal
LA English
AB Dopamine-.beta.-hydroxylase (D.beta.H) is a copper-contg. enzyme that uses
mol. oxygen and ascorbate to catalyze the addn. of a hydroxyl group on the
.beta.-carbon of dopamine to form norepinephrine. While norepinephrine
causes vasoconstriction following reflex sympathetic stimulation, nitric
oxide (NO) formation results in **vasodilatation** via a guanylyl

cyclase-dependent mechanism. The authors investigated the relationship between NO and D.beta.H enzymic activity. In the initial in vitro expts., the activity of purified D.beta.H was inhibited by the NO donor, diethylamine/NO (DEA/NO), with an IC50 of 1 mM. The inclusion of either azide or GSH partially restored D.beta.H activity, suggesting the involvement of the reactive nitrogen oxide species, N2O3. Treatment of human neuroblastoma cells (SK-N-MC) with diethylamine/NO decreased cellular D.beta.H activity without affecting their growth rate and was augmented by the depletion of intracellular GSH. Coculture of the SK-N-MC cells with interferon-.gamma. and lipopolysaccharide-activated macrophages, which release NO, also reduced the D.beta.H activity in the neuroblastoma cells. The authors' results are consistent with the hypothesis that nitrosative stress, mediated by N2O3, can result in the inhibition of norepinephrine biosynthesis and may contribute to the regulation of neurotransmission and **vasodilation**.

RE.CNT 36 THERE ARE 36 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L29 ANSWER 3 OF 8 CAPLUS COPYRIGHT 2002 ACS

AN 2000:214572 CAPLUS

DN 132:263754

TI Nitric oxide as the regulator of some functions of the immune system

AU Klink, Magdalena; Cedzynski, Maciej

CS Centrum Mikrobiologii i Wirusologii, PAN, Lodz, 93-232, Pol.

SO Postepy Biologii Komorki (1999), 26(4), 775-791

CODEN: PBKODV; ISSN: 0324-833X

PB Fundacja Biologii Komorki i Biologii Molekularnej

DT Journal; General Review

LA Polish

AB A review with 61 refs. Nitric oxide (NO) is a highly active mol. playing a key role in physiol. as well as pathol. processes in the organism. This metabolite is produced from L-arginine by NO synthase (NOS) in numerous cells of immune, cardiovascular and nervous systems. Recently, the alternative, NO synthase-independent pathway of nitric oxide generation is discussed. The effect of nitric oxide on mammalian cells is closely connected with its local concn. In the lower concns. it acts as a neurotransmitter and is implicated in **vasodilatation**, while in higher shows pro-inflammatory and cytotoxic activity. The activity of nitric oxide depends mainly on its reactive intermediates (nitrite, **dinitrogen trioxide**, peroxyxynitrite, nitrozoperoxyxynitrite). Among other cells, neutrophils are being considered as NO producers. Exo- as well as endogenous NO diminishes their aggregation and modulates the adhesive and chemotactic properties and liberation of the reactive oxygen species.

L29 ANSWER 4 OF 8 CAPLUS COPYRIGHT 2002 ACS

AN 1997:751639 CAPLUS

DN 128:73389

TI Potency and kinetics of nitric oxide-mediated vascular smooth muscle relaxation determined with flash photolysis of ruthenium nitrosyl chlorides

AU Carter, T. D.; Bettache, N.; Ogden, D.

CS National Institute for Medical Research, London, NW7 1AA, UK

SO British Journal of Pharmacology (1997), 122(6), 971-973

CODEN: BJPCBM; ISSN: 0007-1188

PB Stockton Press

DT Journal

LA English

AB Flash photolysis of thermally stable, photolabile "caged" precursors

permits rapid and precise changes of ligand concn. at their site of action. This approach was used to det. the concn.-dependence and time course of NO-mediated relaxation of aortic smooth muscle, by use of two photolabile NO donors, trichloronitrosylruthenium (Ru(NO)Cl₃) and dipotassium pentachloronitrosyl-ruthenate (K₂Ru(NO)Cl₅). At concns. up to 500 .mu.M, both compds. were non-toxic before photolysis, and produced non-toxic byproducts on photolysis. Photolytic release of NO produced relaxations of intact and endothelium-denuded aortic rings precontracted with noradrenaline (0.1-0.5 .mu.M), with an EC₅₀ for NO-mediated relaxations of 10.5 nM and 13 nM, resp. NO-mediated relaxations were reversibly blocked by 1 .mu.M oxyHb. The time course of NO-mediated relaxation comprised a delay of 3-7 s, followed by a sigmoidal decline in tension with peak rates that were strongly dependent on NO concn.

L29 ANSWER 5 OF 8 CAPLUS COPYRIGHT 2002 ACS

AN 1995:962224 CAPLUS

DN 124:79770

TI Kinetics of nitrosation of thiols by nitric oxide in the presence of oxygen

AU Kharitonov, Vladimir G.; Sundquist, Alfred R.; Sharma, Vijay S.

CS Department of Medicine, University of California, San Diego, CA, 92093-0652, USA

SO J. Biol. Chem. (1995), 270(47), 28158-64

CODEN: JBCHA3; ISSN: 0021-9258

DT Journal

LA English

AB Nitrosothiols are powerful **vasodilators**. They act by releasing nitric oxide, which activates the heme protein guanylate cyclase. We have studied the kinetics of nitrosothiol formation of glutathione, cysteine, N-acetylcysteine, human serum albumin, and bovine serum albumin upon reaction with nitric oxide (NO) in the presence of oxygen. These studies have been made at low pH as well as at physiol. pH. At pH 7.0, contrary to published reports, nitric oxide by itself does not react with thiols to yield nitrosothiol. However, formation of nitrosothiols is obsd. in the presence of oxygen. For all thiols studied, the rates of nitrosothiol formation were first order in O₂ concn. and second order in NO concn. and at lower concns. (<5 mM thiol) also depended on thiol concns. Anal. of the kinetic data indicated that the rate-limiting step was the reaction of NO with oxygen. Anal. of the reaction products suggest that the main nitrosating species is N₂O₃: RSH + N₂O₃ .fwdarw. RSNO + NO₂⁻ + H⁺. Rate consts. for this reaction for glutathione and several other low mol. wt. thiols are in the range of 3-1.5 .times. 10⁵ M⁻¹ s⁻¹, and for human and bovine serum albumins 0.3 .times. 10⁵ M⁻¹ s⁻¹ and 0.06 .times. 10⁵ M⁻¹ s⁻¹, resp. The data further indicate that the reaction rate of the nitrosating species N₂O₃ with thiols is competitive with its rate of hydrolysis. At physiol. concns. nitrosoglutathione formation represents a significant metabolic fate of N₂O₃, and at glutathione concns. of 5 mM or higher almost all of N₂O₃ formed is consumed in nitrosation of glutathione. Implications of these results for in vivo nitrosation of thiols are discussed.

L29 ANSWER 6 OF 8 CAPLUS COPYRIGHT 2002 ACS

AN 1995:38380 CAPLUS

DN 123:80300

TI Endogenous nitric oxide synthesis determines sensitivity to the pressor effect of salt

AU Tolins, Jonathan P.; Shultz, Pamela J.

CS Minneapolis VAMC, University Minnesota School Medicine, Minneapolis, MN, USA

SO Kidney Int. (1994), 46(1), 230-6
CODEN: KDYIA5; ISSN: 0085-2538
DT Journal
LA English
AB Endogenous nitric oxide plays an important role in modulation of renal hemodynamics and sodium handling, with increased nitric oxide prodn. inducing renal **vasodilation** and natriuresis. In the normal rat, nitric oxide activity increases as an adaptive response to increased dietary salt intake, perhaps facilitating natriuresis and thus blood pressure homeostasis. We hypothesized that impaired nitric oxide synthetic ability would result in sensitivity to the pressor effects of high dietary salt intake. Four groups of normal Sprague-Dawley rats were obsd. for eight weeks: Control, 0.4% NaCl chow and tap water; Salt, 4% NaCl chow and tap water; NAME, 0.4% NaCl chow and water contg. the nitric oxide synthase inhibitor, L-nitro-arginine-Me ester; Salt+NAME, 4% NaCl chow and water contg. L-nitro-arginine-Me ester. Compared to Controls, Salt rats demonstrated a significant increase in urinary excretion rate of the stable nitric oxide metabolites, NO₂ and NO₃, and had no increase in blood pressure. Furthermore, Salt rats had no functional or structural evidence of renal injury. In contrast, Salt+NAME rats demonstrated a significantly higher blood pressure than NAME rats, and urinary NO₂ and NO₃ excretion rate did not increase despite high salt intake. After eight weeks, Salt+NAME rats had significantly impaired renal function and proteinuria. We conclude that adaptive changes in endogenous NO prodn. play a crit. role in sodium and blood pressure homeostasis. Furthermore, impaired nitric oxide synthase activity may be a pathogenetic factor in the development of salt-sensitive hypertension.

L29 ANSWER 7 OF 8 CAPLUS COPYRIGHT 2002 ACS
AN 1982:103944 CAPLUS
DN 96:103944
TI Structure and synthesis of a new hypotensive **vasodilator** isolated from Streptomyces aureofaciens
AU Tanaka, Hirokazu; Yoshida, Keizo; Itoh, Yoshikuni; Imanaka, Hiroshi
CS Ferment. Res. Lab., Fujisawa Pharm. Co., Ltd., Osaka, 532, Japan
SO Tetrahedron Lett. (1981), 22(35), 3421-2
CODEN: TELEAY; ISSN: 0040-4039
DT Journal
LA English
AB The structure of the hypotensive **vasodilator** WS-1228 A (I), from S. aureofaciens, was detd. by spectral anal. and confirmed by synthesis from trans-PrCH:CHCH₂Br and HC.tplbond.CCH₂OR (R = tetrahydropyranyl) in 9 steps.

L29 ANSWER 8 OF 8 WPIDS (C) 2002 THOMSON DERWENT
AN 1992-152362 [19] WPIDS
DNC C1992-070436
TI New aliphatic amide derivs. prodn. - comprises reacting aldehyde with Wittig reagents and without isolating, reacting it with nitrite and acid intermediate.
DC B05
IN KAGARA, K; KAWAI, N; MACHIYA, K; TAKASUKA, K
PA (FUJI) FUJISAWA PHARM CO LTD; (FUJI) FUJISAWA YAKUHHIN KOGYO KK
CYC 24
PI EP 483674 A 19920506 (199219)* EN 13p
R: AT BE CH DE DK ES FR GB GR IT LI LU NL SE
HU 59371 T 19920528 (199227)
NO 9104262 A 19920504 (199227)
CA 2054491 A 19920501 (199229)

FI 9105109	A	19920501	(199232)	
CN 1061024	A	19920513	(199304)	
JP 05025111	A	19930202	(199310)	7p
HU 207987	B	19930728	(199336)	
TW 206206	A	19930521	(199338)	
US 5254733	A	19931019	(199343)	5p
EP 483674	B1	19941228	(199505)	EN 14p
R: AT BE CH DE DK ES FR GB GR IT LI LU NL SE				
DE 69106316	E	19950209	(199511)	
ES 2065598	T3	19950216	(199513)	
JP 08019070	B2	19960228	(199613)	6p
RU 2051903	C1	19960110	(199642)#	5p
NO 180416	B	19970106	(199708)	
KR 187734	B1	19990601	(200055)	

ADT EP 483674 A EP 1991-118202 19911025; HU 59371 T HU 1991-3420 19911030; NO 9104262 A NO 1991-4262 19911030; CA 2054491 A CA 1991-2054491 19911029; FI 9105109 A FI 1991-5109 19911030; CN 1061024 A CN 1991-108100 19911030; JP 05025111 A JP 1991-298207 19911017; HU 207987 B HU 1991-3420 19911030; TW 206206 A TW 1991-108360 19911023; US 5254733 A US 1991-775456 19911015; EP 483674 B1 EP 1991-118202 19911025; DE 69106316 E DE 1991-606316 19911025, EP 1991-118202 19911025; ES 2065598 T3 EP 1991-118202 19911025; JP 08019070 B2 JP 1991-298207 19911017; RU 2051903 C1 SU 1991-5001939 19911030; NO 180416 B NO 1991-4262 19911030; KR 187734 B1 KR 1991-19119 19911030

FDT HU 207987 B Previous Publ. HU 59371; DE 69106316 E Based on EP 483674; ES 2065598 T3 Based on EP 483674; JP 08019070 B2 Based on JP 05025111; NO 180416 B Previous Publ. NO 9104262

PRAI JP 1990-296815 19901031; SU 1991-5001939 19911030

AB EP 483674 A UPAB: 19931006

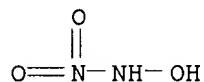
Prodn. of an aliphatic amide of formula (I) comprises reacting an aliphatic aldehyde (II) with a Wittig reagent (IV), the intermediate (III) without or after isolation is reacted with a **dinitrogen trioxide**, or in the presence of an acid, a nitrite is new. In (I) R1, R2 and R3 = H, lower alkyl or a salt. The wittig reagent of formula Y-CONH2 (IV). Y is a gp. of formula (a), (b), (c), (d), or (e), where R10-R14 = phenyl or lower alkyl-substd.-phenyl gp.; R4 to R9 = same or different lower alkyl. More specifically R1, R2 and R3 = H, methyl or ethyl; Y = a; R4 and R5 = lower alkyl gp..

USE/ADVANTAGE - (I) exhibit **vasodilating**, antithrombotic and antianginal and other pharmacological actions. The process provides (I) in a reduced number of steps and in enhanced yield. It is advantageous in terms of processability and yield, to conduct the subsequent reaction without isolating the intermediate (III) to give (I). (0/0)
0/0

=>

5 other A.I.

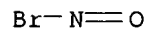
L42 ANSWER 1 OF 5 REGISTRY COPYRIGHT 2002 ACS
RN 13826-64-7 REGISTRY
CN Hyponitric acid, disodium salt (8CI, 9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Sodium hyponitrate (6CI)
CN Sodium N-nitrohydroxylamine (7CI)
OTHER NAMES:
CN Angeli's salt
CN Angeli's salt (Na2N2O3)
CN OXI/NO
CN Sodium hyponitrate (Na2N2O3)
CN Sodium oxyhyponitrite
DR 213767-89-6
MF H2 N2 O3 . 2 Na
LC STN Files: BIOSIS, CA, CAOLD, CAPLUS, CASREACT, CHEMCATS, CSCHEM, DDFU,
DRUGU, GMELIN*, IFICDB, IFIUDB, TOXCENTER, USPATFULL
(*File contains numerically searchable property data)
CRN (18550-55-5)



2 Na

78 REFERENCES IN FILE CA (1967 TO DATE)
78 REFERENCES IN FILE CAPLUS (1967 TO DATE)
15 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

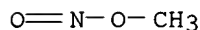
L42 ANSWER 2 OF 5 REGISTRY COPYRIGHT 2002 ACS
RN 13444-87-6 REGISTRY
CN Nitrosyl bromide ((NO)Br) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Nitrosyl bromide (6CI, 7CI, 8CI)
OTHER NAMES:
CN Nitrogen oxybromide
CN Nitrosonium bromide
FS 3D CONCORD
MF Br N O
CI COM
LC STN Files: BIOSIS, CA, CAOLD, CAPLUS, CASREACT, DETHERM*, GMELIN*,
IFICDB, IFIPAT, IFIUDB, TOXCENTER, USPATFULL
(*File contains numerically searchable property data)



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

145 REFERENCES IN FILE CA (1967 TO DATE)
1 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
145 REFERENCES IN FILE CAPLUS (1967 TO DATE)
29 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

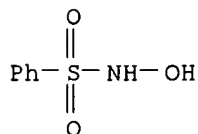
L42 ANSWER 3 OF 5 REGISTRY COPYRIGHT 2002 ACS
 RN 624-91-9 REGISTRY
 CN Nitrous acid, methyl ester (8CI, 9CI) (CA INDEX NAME)
 OTHER CA INDEX NAMES:
 CN **Methyl nitrite (6CI)**
 FS 3D CONCORD
 MF C H3 N O2
 CI COM
 LC STN Files: AGRICOLA, ANABSTR, BEILSTEIN*, BIOBUSINESS, BIOSIS, CA, CAOLD, CAPLUS, CASREACT, CEN, CHEMINFORMRX, CHEMLIST, CHEMSAFE, CSNB, DETHERM*, EMBASE, GMELIN*, HODOC*, IFICDB, IFIPAT, IFIUDB, MEDLINE, MSDS-OHS, NIOSHTIC, RTECS*, SPECINFO, TOXCENTER, USPAT2, USPATFULL
 (*File contains numerically searchable property data)
 Other Sources: EINECS**, NDSL**, TSCA**
 (**Enter CHEMLIST File for up-to-date regulatory information)



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

706 REFERENCES IN FILE CA (1967 TO DATE)
 5 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
 707 REFERENCES IN FILE CAPLUS (1967 TO DATE)
 45 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L42 ANSWER 4 OF 5 REGISTRY COPYRIGHT 2002 ACS
 RN 599-71-3 REGISTRY
 CN Benzenesulfonamide, N-hydroxy- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)
 OTHER NAMES:
 CN Benzenesulfohydroxamic acid
 CN Hydroxylamine, N-(phenylsulfonyl)-
 CN N-(Phenylsulfonyl)hydroxylamine
 CN N-Hydroxybenzenesulfonamide
 CN **Piloty's acid**
 FS 3D CONCORD
 MF C6 H7 N O3 S
 CI COM
 LC STN Files: AGRICOLA, BEILSTEIN*, BIOBUSINESS, BIOSIS, CA, CAOLD, CAPLUS, CASREACT, CHEMCATS, CHEMLIST, CSCHM, GMELIN*, HODOC*, IFICDB, IFIPAT, IFIUDB, MEDLINE, MSDS-OHS, RTECS*, SPECINFO, SYNTHLINE, TOXCENTER, USPATFULL
 (*File contains numerically searchable property data)
 Other Sources: DSL**, EINECS**, TSCA**
 (**Enter CHEMLIST File for up-to-date regulatory information)



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

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1 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
58 REFERENCES IN FILE CAPLUS (1967 TO DATE)
15 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L42 ANSWER 5 OF 5 REGISTRY COPYRIGHT 2002 ACS

RN 109-95-5 REGISTRY

CN Nitrous acid, ethyl ester (8CI, 9CI) (CA INDEX NAME)

OTHER CA INDEX NAMES:

CN Ethyl nitrite (6CI, 7CI)

OTHER NAMES:

CN N2O

CN Nitrosyl ethoxide

CN Nitrous ether

CN Nitrous ethyl ether

CN Spirit of ethyl nitrite

CN Sweet spirit of niter

FS 3D CONCORD

DR 8013-58-9

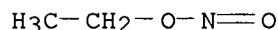
MF C2 H5 N O2

CI COM

LC STN Files: ADISNEWS, AGRICOLA, BEILSTEIN*, BIOBUSINESS, BIOSIS, CA,
CAOLD, CAPLUS, CASREACT, CEN, CHEMCATS, CHEMINFORMRX, CHEMLIST,
CHEMSAFE, CIN, CSCHM, CSNB, DETHERM*, DIOGENES, EMBASE, GMELIN*,
HODOC*, HSDB*, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*, MSDS-OHS,
NIOHTIC, PDLCOM*, PIRA, PROMT, RTECS*, TOXCENTER, USAN, USPATFULL
(*File contains numerically searchable property data)

Other Sources: DSL**, EINECS**, TSCA**

(**Enter CHEMLIST File for up-to-date regulatory information)



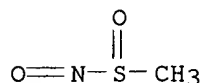
PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

330 REFERENCES IN FILE CA (1967 TO DATE)
2 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
330 REFERENCES IN FILE CAPLUS (1967 TO DATE)
39 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

=>

Compounds pulled from
US CIP parent
6,314,986

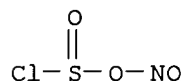
L20 ANSWER 1 OF 19 REGISTRY COPYRIGHT 2002 ACS
RN 171862-29-6 REGISTRY
CN Methane, (nitrososulfinyl)- (9CI) (CA INDEX NAME)
FS 3D CONCORD
MF C H3 N O2 S
SR CA
LC STN Files: CA, CAPLUS, TOXCENTER, USPATFULL



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

2 REFERENCES IN FILE CA (1967 TO DATE)
2 REFERENCES IN FILE CAPLUS (1967 TO DATE)

L20 ANSWER 2 OF 19 REGISTRY COPYRIGHT 2002 ACS
RN 91682-27-8 REGISTRY
CN Chlorosulfinyl nitrite ((SClO)(NO2)) (9CI) (CA INDEX NAME)
FS 3D CONCORD
MF Cl N O3 S
LC STN Files: CA, CAPLUS, CASREACT, TOXCENTER, USPATFULL



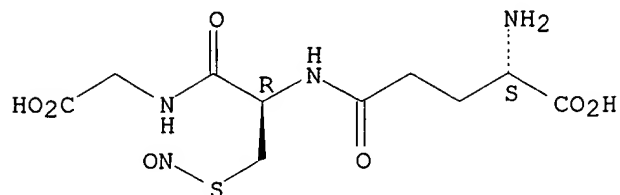
PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

2 REFERENCES IN FILE CA (1967 TO DATE)
2 REFERENCES IN FILE CAPLUS (1967 TO DATE)

L20 ANSWER 3 OF 19 REGISTRY COPYRIGHT 2002 ACS
RN 57564-91-7 REGISTRY
CN Glycine, L-.gamma.-glutamyl-S-nitroso-L-cysteinyl- (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Glycine, N-(N-L-.gamma.-glutamyl-S-nitroso-L-cysteinyl)-
OTHER NAMES:
CN Nitrosoglutathione
CN RVC 588
CN RVC 588 (peptide)
CN S-Nitrosoglutathione
CN S-Nitrosylglutathione
CN SNOG
FS STEREOSEARCH
DR 162764-02-5
MF C10 H16 N4 O7 S
CI COM
LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, BEILSTEIN*, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CANCERLIT, CAPLUS, CASREACT, CHEMCATS, CIN, CSCHM, DDFU, DRUGU, EMBASE, IPA, MEDLINE, PROMT, RTECS*, TOXCENTER, USPAT2, USPATFULL

(*File contains numerically searchable property data)

Absolute stereochemistry.



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

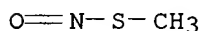
490 REFERENCES IN FILE CA (1967 TO DATE)
13 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
492 REFERENCES IN FILE CAPLUS (1967 TO DATE)

L20 ANSWER 4 OF 19 REGISTRY COPYRIGHT 2002 ACS
RN 53214-60-1 REGISTRY
CN Sulfinyl nitrate (SO(NO3)2) (9CI) (CA INDEX NAME)
MF N2 O7 S
CI MAN
LC STN Files: CA, CAPLUS, CASREACT, TOXCENTER, USPATFULL

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

3 REFERENCES IN FILE CA (1967 TO DATE)
3 REFERENCES IN FILE CAPLUS (1967 TO DATE)

L20 ANSWER 5 OF 19 REGISTRY COPYRIGHT 2002 ACS
RN 22223-61-6 REGISTRY
CN Thionitrous acid (HNOS), S-methyl ester (8CI, 9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Methyl thionitrite (6CI, 7CI)
FS 3D CONCORD
MF C H3 N O S
LC STN Files: BEILSTEIN*, CA, CAOLD, CAPLUS, CASREACT, TOXCENTER, USPATFULL
(*File contains numerically searchable property data)



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

26 REFERENCES IN FILE CA (1967 TO DATE)
26 REFERENCES IN FILE CAPLUS (1967 TO DATE)
4 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 6 OF 19 REGISTRY COPYRIGHT 2002 ACS
RN 14332-28-6 REGISTRY
CN Nitrosyl hydride ((NO)H) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Nitrosyl hydride (7CI, 8CI)
OTHER NAMES:
CN Hydrogen nitride oxide (HNO)

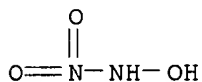
CN Hydrogen nitrogen oxide (HNO)
 CN Hydrogen nitroxide
 CN Nitrosyl hydride (HNO)
 CN Nitrosyl, of Angeli
 CN Nitroxyl
 CN Nitroxyl (HNO)
 MF H N O
 CI COM
 LC STN Files: AGRICOLA, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CANCERLIT,
 CAOLD, CAPLUS, CIN, DDFU, DETHERM*, DRUGU, EMBASE, GMELIN*, MEDLINE,
 PIRA, PROMT, TOXCENTER, USPATFULL
 (*File contains numerically searchable property data)

HN=O

PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

489 REFERENCES IN FILE CA (1967 TO DATE)
 8 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
 490 REFERENCES IN FILE CAPLUS (1967 TO DATE)
 18 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 7 OF 19 REGISTRY COPYRIGHT 2002 ACS
 RN **13826-64-7** REGISTRY
 CN Hyponitric acid, disodium salt (8CI, 9CI) (CA INDEX NAME)
 OTHER CA INDEX NAMES:
 CN Sodium hyponitrate (6CI)
 CN Sodium N-nitrohydroxylamine (7CI)
 OTHER NAMES:
 CN Angeli's salt
 CN Angeli's salt (Na₂N₂O₃)
 CN OXI/NO
 CN Sodium hyponitrate (Na₂N₂O₃)
 CN Sodium oxyhyponitrite
 DR 213767-89-6
 MF H₂ N₂ O₃ . 2 Na
 LC STN Files: BIOSIS, CA, CAOLD, CAPLUS, CASREACT, CHEMCATS, CSCHEM, DDFU,
 DRUGU, GMELIN*, IFICDB, IFIUDB, TOXCENTER, USPATFULL
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 CRN (18550-55-5)

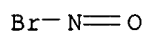


2 Na

78 REFERENCES IN FILE CA (1967 TO DATE)
 78 REFERENCES IN FILE CAPLUS (1967 TO DATE)
 15 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 8 OF 19 REGISTRY COPYRIGHT 2002 ACS

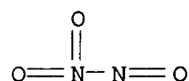
RN 13444-87-6 REGISTRY
 CN Nitrosyl bromide ((NO)Br) (9CI) (CA INDEX NAME)
 OTHER CA INDEX NAMES:
 CN Nitrosyl bromide (6CI, 7CI, 8CI)
 OTHER NAMES:
 CN Nitrogen oxybromide
 CN Nitrosonium bromide
 FS 3D CONCORD
 MF Br N O
 CI COM
 LC STN Files: BIOSIS, CA, CAOLD, CAPLUS, CASREACT, DETHERM*, GMELIN*,
 IFICDB, IFIPAT, IFIUDB, TOXCENTER, USPATFULL
 (*File contains numerically searchable property data)



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

145 REFERENCES IN FILE CA (1967 TO DATE)
 1 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
 145 REFERENCES IN FILE CAPLUS (1967 TO DATE)
 29 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 9 OF 19 REGISTRY COPYRIGHT 2002 ACS
 RN 10544-73-7 REGISTRY
 CN Nitrogen oxide (N2O3) (8CI, 9CI) (CA INDEX NAME)
 OTHER NAMES:
 CN asym-Dinitrogen trioxide
 CN Dinitrogen trioxide
 CN Nitrogen sesquioxide
 CN Nitrogen trioxide
 CN Nitrogen trioxide (N2O3)
 CN Nitrous anhydride
 FS 3D CONCORD
 DR 16529-92-3, 96607-26-0, 51974-74-4, 91913-71-2
 MF N2 O3
 CI COM
 LC STN Files: AGRICOLA, BIOBUSINESS, BIOSIS, CA, CANCERLIT, CAOLD, CAPLUS,
 CASREACT, CEN, CHEMINFORMRX, CHEMLIST, CIN, CSCHM, CSNB, DETHERM*,
 DIPPR*, IFICDB, IFIPAT, IFIUDB, MEDLINE, MSDS-OHS, NIOSHTIC, PIRA,
 TOXCENTER, USPATFULL
 (*File contains numerically searchable property data)
 Other Sources: EINECS**, NDSL**, TSCA**
 (**Enter CHEMLIST File for up-to-date regulatory information)



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

517 REFERENCES IN FILE CA (1967 TO DATE)
 3 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA

517 REFERENCES IN FILE CAPLUS (1967 TO DATE)
4 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 10 OF 19 REGISTRY COPYRIGHT 2002 ACS
RN 10102-43-9 REGISTRY
CN Nitrogen oxide (NO) (8CI, 9CI) (CA INDEX NAME)
OTHER NAMES:
CN Amidogen, oxo-
CN INOmax
CN Nitric oxide
CN Nitric oxide (NO)
CN Nitric oxide trimer
CN Nitrogen monooxide
CN Nitrogen monoxide
CN Nitrogen oxide (N4O4)
CN Nitrogen(II) oxide
CN Nitrosyl radical
CN OHM 11771
DR 53851-19-7, 51005-20-0, 51005-21-1, 90452-29-2
MF N O
CI COM
LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO,
CA, CABA, CANCERLIT, CAPLUS, CASREACT, CBNB, CEN, CHEMCATS,
CHEMINFORMRX, CHEMLIST, CHEMSAFE, CIN, CSCHEM, CSNB, DDFU, DETHERM*,
DIOGENES, DIPPR*, DRUGU, DRUGUPDATES, EMBASE, ENCOMPLIT, ENCOMPLIT2,
ENCOMPPAT, ENCOMPPAT2, GMELIN*, HSDB*, IFICDB, IFIPAT, IFIUDB, IPA,
MEDLINE, MRCK*, MSDS-OHS, NIOSHTIC, PDLCOM*, PIRA, PROMT, RTECS*,
SPECINFO, TOXCENTER, TULSA, ULIDAT, USPAT2, USPATFULL, VETU, VTB
(*File contains numerically searchable property data)
Other Sources: DSL**, EINECS**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)

N=O

64572 REFERENCES IN FILE CA (1967 TO DATE)
406 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
64654 REFERENCES IN FILE CAPLUS (1967 TO DATE)

L20 ANSWER 11 OF 19 REGISTRY COPYRIGHT 2002 ACS
RN 7789-25-5 REGISTRY
CN Nitrosyl fluoride ((NO)F) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Nitrosyl fluoride (6CI, 8CI)
OTHER NAMES:
CN Nitrogen fluoride oxide (NOF)
CN Nitrogen oxide fluoride (NOF)
CN Nitrogen oxyfluoride
FS 3D CONCORD
DR 17116-40-4
MF F N O
CI COM
LC STN Files: BIOSIS, CA, CAOLD, CAPLUS, CASREACT, CHEMCATS, CHEMLIST,
CSCHEM, DETHERM*, GMELIN*, IFICDB, IFIPAT, IFIUDB, MRCK*, TOXCENTER,
USPATFULL
(*File contains numerically searchable property data)
Other Sources: EINECS**
(**Enter CHEMLIST File for up-to-date regulatory information)

F-N=O

****PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT****

300 REFERENCES IN FILE CA (1967 TO DATE)
300 REFERENCES IN FILE CAPLUS (1967 TO DATE)
31 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 12 OF 19 REGISTRY COPYRIGHT 2002 ACS

RN **7783-06-4** REGISTRY

CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

OTHER NAMES:

CN Dihydrogen monosulfide

CN Dihydrogen sulfide

CN Hydrogen sulfide

CN Hydrosulfuric acid

CN Stink damp

CN Sulfur dihydride

CN Sulfur hydride

CN Sulfur hydride (SH2)

CN Sulfureted hydrogen

FS 3D CONCORD

DR 11144-15-3

MF H2 S

CI COM

LC STN Files: AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CABA, CANCERLIT, CAPLUS, CASREACT, CBNB, CEN, CHEMCATS, CHEMINFORMRX, CHEMLIST, CHEMSAFE, CIN, CSCHEM, CSNB, DETHERM*, DIPPR*, EMBASE, ENCOMPLIT, ENCOMPLIT2, ENCOMPPAT, ENCOMPPAT2, GMELIN*, HSDB*, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*, MSDS-OHS, NAPRALERT, NIOSHTIC, PDLCOM*, PIRA, PROMT, RTECS*, SPECINFO, TOXCENTER, TULSA, ULIDAT, USPAT2, USPATFULL, VTB

(*File contains numerically searchable property data)

Other Sources: DSL**, EINECS**, TSCA**

(**Enter CHEMLIST File for up-to-date regulatory information)

H2S

35489 REFERENCES IN FILE CA (1967 TO DATE)
176 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
35513 REFERENCES IN FILE CAPLUS (1967 TO DATE)

L20 ANSWER 13 OF 19 REGISTRY COPYRIGHT 2002 ACS

RN **7782-44-7** REGISTRY

CN Oxygen (8CI, 9CI) (CA INDEX NAME)

OTHER NAMES:

CN Dioxygen

CN Molecular oxygen

CN Oxygen molecule

FS 3D CONCORD

DR 1338-93-8, 14797-70-7, 80217-98-7, 80937-33-3

MF O2

CI COM

LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO,
CA, CABA, CANCERLIT, CAPLUS, CASREACT, CBNB, CEN, CHEMCATS,
CHEMINFORMRX, CHEMLIST, CHEMSAFE, CIN, CSCHM, CSNB, DDFU, DETHERM*,
DIOGENES, DIPPR*, DRUGU, EMBASE, ENCOMPLIT, ENCOMPLIT2, ENCOMPPAT,
ENCOMPPAT2, GMELIN*, HSDB*, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*,
MSDS-OHS, NIOSHTIC, PDLCOM*, PIRA, PROMT, RTECS*, SPECINFO, TOXCENTER,
TULSA, ULIDAT, USAN, USPAT2, USPATFULL, VTB
(*File contains numerically searchable property data)
Other Sources: DSL**, EINECS**, TSCA**
(*Enter CHEMLIST File for up-to-date regulatory information)

O=O

PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

269035 REFERENCES IN FILE CA (1967 TO DATE)
21260 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
268947 REFERENCES IN FILE CAPLUS (1967 TO DATE)

L20 ANSWER 14 OF 19 REGISTRY COPYRIGHT 2002 ACS
RN **4343-68-4** REGISTRY
CN Nitrosyl cyanide ((NO)(CN)) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Nitrosyl cyanide (7CI, 8CI)
OTHER NAMES:
CN 1-Aza-2-nitrosoethyne
FS 3D CONCORD
MF C N2 O
LC STN Files: BEILSTEIN*, BIOSIS, CA, CAOLD, CAPLUS, CASREACT, DETHERM*,
GMELIN*, MEDLINE, TOXCENTER, USPATFULL
(*File contains numerically searchable property data)

O=N-C≡N

PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

77 REFERENCES IN FILE CA (1967 TO DATE)
77 REFERENCES IN FILE CAPLUS (1967 TO DATE)
2 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 15 OF 19 REGISTRY COPYRIGHT 2002 ACS
RN **2696-92-6** REGISTRY
CN Nitrosyl chloride ((NO)Cl) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Nitrosyl chloride (8CI)
OTHER NAMES:
CN Chlorine nitride oxide (ClNO)
CN Nitrogen oxide chloride (NOCl)
CN Nitrogen oxychloride
CN Nitrogen oxychloride (NOCl)
CN Nitrosochloride
CN Nitrosonium chloride
FS 3D CONCORD

DR 74734-38-6
MF Cl N O
CI COM
LC STN Files: AGRICOLA, BIOBUSINESS, BIOSIS, CA, CAOLD, CAPLUS, CASREACT,
CHEMINFORMRX, CHEMLIST, CSCHM, CSNB, DETHERM*, DIPPR*, ENCOMPLIT,
ENCOMPLIT2, ENCOMPPAT, ENCOMPPAT2, GMELIN*, HSDB*, IFICDB, IFIPAT,
IFIUDB, MEDLINE, MRCK*, MSDS-OHS, NIOSHTIC, PDLCOM*, PIRA, PROMT,
SPECINFO, TOXCENTER, USPATFULL, VTB
(*File contains numerically searchable property data)
Other Sources: EINECS**, NDSL**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)

Cl-N=O

PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

1023 REFERENCES IN FILE CA (1967 TO DATE)
7 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
1023 REFERENCES IN FILE CAPLUS (1967 TO DATE)
24 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 16 OF 19 REGISTRY COPYRIGHT 2002 ACS

RN 616-91-1 REGISTRY

CN L-Cysteine, N-acetyl- (9CI) (CA INDEX NAME)

OTHER CA INDEX NAMES:

CN Cysteine, N-acetyl-, L- (6CI, 8CI)

OTHER NAMES:

CN (S)-N-Acetylcysteine

CN Acetylcysteine

CN Airbron

CN Broncholysin

CN Broncholysin (mucolytic)

CN Exomuc

CN Fluibiotic

CN Fluimicil

CN Fluimicil Infantil

CN Fluimucetin

CN Fluimucil

CN L-Acetylcysteine

CN L-N-Acetylcysteine

CN Mercapturic acid

CN Mercapturic acid, (R)-

CN Mucofilin

CN Mucolyticum-Lappe

CN Mucolytikum Lappe

CN Mucomyst

CN Mucosolvin

CN N-Acetyl-(R)-cysteine

CN N-Acetyl-L-cysteine

CN N-Acetylcysteine

CN N.alpha.-Acetylcysteine

CN NAC

CN NSC 111180

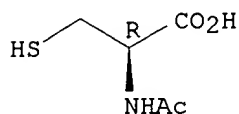
CN Parvolex

CN Respire

FS STEREOSEARCH

DR 7696-05-1
 MF C5 H9 N O3 S
 CI COM
 LC STN Files: ADISINSIGHT, ADISNEWS, AGRICOLA, ANABSTR, BEILSTEIN*,
 BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CABA, CANCERLIT, CAOLD, CAPLUS,
 CASREACT, CBNB, CHEMCATS, CHEMINFORMRX, CHEMLIST, CIN, CSCHM, CSNB,
 DDFU, DIOGENES, DRUGNL, DRUGU, DRUGUPDATES, EMBASE, GMELIN*, HODOC*,
 HSDB*, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*, MSDS-OHS, NIOSHTIC,
 PHAR, PHARMASEARCH, PROMT, RTECS*, SPECINFO, SYNTHLINE, TOXCENTER, USAN,
 USPATFULL, VETU
 (*File contains numerically searchable property data)
 Other Sources: DSL**, EINECS**, TSCA**, WHO
 (**Enter CHEMLIST File for up-to-date regulatory information)

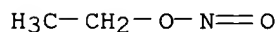
Absolute stereochemistry.



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

4414 REFERENCES IN FILE CA (1967 TO DATE)
 205 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
 4419 REFERENCES IN FILE CAPLUS (1967 TO DATE)
 28 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 17 OF 19 REGISTRY COPYRIGHT 2002 ACS
 RN 109-95-5 REGISTRY
 CN Nitrous acid, ethyl ester (8CI, 9CI) (CA INDEX NAME)
 OTHER CA INDEX NAMES:
 CN Ethyl nitrite (6CI, 7CI)
 OTHER NAMES:
 CN N2O
 CN Nitrosyl ethoxide
 CN Nitrous ether
 CN Nitrous ethyl ether
 CN Spirit of ethyl nitrite
 CN Sweet spirit of niter
 FS 3D CONCORD
 DR 8013-58-9
 MF C2 H5 N O2
 CI COM
 LC STN Files: ADISNEWS, AGRICOLA, BEILSTEIN*, BIOBUSINESS, BIOSIS, CA,
 CAOLD, CAPLUS, CASREACT, CEN, CHEMCATS, CHEMINFORMRX, CHEMLIST,
 CHEMSAFE, CIN, CSCHM, CSNB, DETHERM*, DIOGENES, EMBASE, GMELIN*,
 HODOC*, HSDB*, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*, MSDS-OHS,
 NIOSHTIC, PDLCOM*, PIRA, PROMT, RTECS*, TOXCENTER, USAN, USPATFULL
 (*File contains numerically searchable property data)
 Other Sources: DSL**, EINECS**, TSCA**
 (**Enter CHEMLIST File for up-to-date regulatory information)



****PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT****

330 REFERENCES IN FILE CA (1967 TO DATE)
2 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
330 REFERENCES IN FILE CAPLUS (1967 TO DATE)
39 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 18 OF 19 REGISTRY COPYRIGHT 2002 ACS

RN **52-90-4** REGISTRY

CN L-Cysteine (9CI) (CA INDEX NAME)

OTHER CA INDEX NAMES:

CN Cysteine, L- (8CI)

OTHER NAMES:

CN (R)-2-Amino-3-mercaptopropanoic acid

CN (R)-Cysteine

CN .beta.-Mercaptoalanine

CN 2-Amino-3-mercaptopropionic acid

CN 318: PN: W00214478 SEQID: 317 claimed sequence

CN Cystein

CN Cysteine

CN Half-cystine

CN L-(+)-Cysteine

CN L-Alanine, 3-mercapto-

CN L-Cys

CN NSC 8746

CN Propanoic acid, 2-amino-3-mercapto-, (R)-

CN Thioserine

FS STEREOSEARCH

DR 4371-52-2

MF C3 H7 N O2 S

CI COM

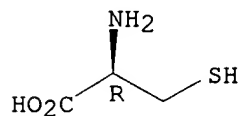
LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, BEILSTEIN*, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CABA, CANCERLIT, CAOLD, CAPLUS, CASREACT, CBNB, CEN, CHEMCATS, CHEMINFORMRX, CHEMLIST, CIN, CSCHM, CSNB, DDFU, DETHERM*, DIOGENES, DRUGU, EMBASE, GMELIN*, HODOC*, HSDB*, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*, MSDS-OHS, NAPRALERT, NIOSHTIC, PIRA, PROMT, RTECS*, SPECINFO, SYNTHLINE, TOXCENTER, ULIDAT, USAN, USPAT2, USPATFULL, VETU

(*File contains numerically searchable property data)

Other Sources: DSL**, EINECS**, TSCA**, WHO

(**Enter CHEMLIST File for up-to-date regulatory information)

Absolute stereochemistry.



****PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT****

26509 REFERENCES IN FILE CA (1967 TO DATE)
1272 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
26545 REFERENCES IN FILE CAPLUS (1967 TO DATE)
9 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L20 ANSWER 19 OF 19 REGISTRY COPYRIGHT 2002 ACS

RN 50-81-7 REGISTRY

CN L-Ascorbic acid (8CI, 9CI) (CA INDEX NAME)

OTHER NAMES:

CN (+)-Ascorbic acid
CN 3-keto-L-Gulofuranolactone
CN 3-Oxo-L-gulofuranolactone
CN Adenex
CN Allercorb
CN Antiscorbic vitamin
CN Antiscorbutic vitamin
CN Ascoltin
CN Ascorbajen
CN Ascorbic acid
CN Ascorbutina
CN Ascorin
CN Ascorteal
CN Ascorvit
CN C-Quin
CN C-Vimin
CN Cantan
CN Cantaxin
CN Catavin C
CN Ce-Mi-Lin
CN Ce-Vi-Sol
CN Cebicure
CN Cebion
CN Cebione
CN Cecon
CN Cegiolan
CN Ceglion
CN Celaskon
CN Celin
CN Cemagyl
CN Cenetone
CN Cereon
CN Cergona
CN Cescorbat
CN Cetamid
CN Cetemican
CN Cevalin
CN Cevatine
CN Cevex
CN Cevimin
CN Cevital
CN Cevitamic acid
CN Cevitamin
CN Cevitan
CN Cevitex
CN Chewcee
CN Ciamin
CN Cipca
CN Citrovit
CN Colascor

ADDITIONAL NAMES NOT AVAILABLE IN THIS FORMAT - Use FCN, FIDE, or ALL for
DISPLAY

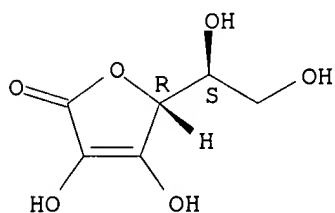
FS STEREOSEARCH

DR 56533-05-2, 57304-74-2, 57606-40-3, 56172-55-5, 129940-97-2, 14536-17-5,
50976-75-5, 154170-90-8, 89924-69-6, 30208-61-8, 259133-78-3

MF C6 H8 O6

CI COM
 LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, BEILSTEIN*, BIOBUSINESS, BIOSIS,
 BIOTECHNO, CA, CABA, CANCERLIT, CAOLD, CAPLUS, CASREACT, CBNB, CEN,
 CHEMCATS, CHEMINFORMRX, CHEMLIST, CIN, CSCHM, CSNB, DDFU, DETHERM*,
 DIOGENES, DIPPR*, DRUGU, EMBASE, ENCOMPLIT, ENCOMPLIT2, ENCOMPPAT,
 ENCOMPPAT2, GMELIN*, HODOC*, HSDB*, IFICDB, IFIPAT, IFIADB, IPA,
 MEDLINE, MRCK*, MSDS-OHS, NAPRALERT, NIOSHTIC, PDLCOM*, PHAR,
 PHARMASEARCH, PIRA, PROMT, RTECS*, SPECINFO, SYNTHLINE, TOXCENTER,
 TULSA, ULIDAT, USAN, USPAT2, USPATFULL, VETU, VTB
 (*File contains numerically searchable property data)
 Other Sources: DSL**, EINECS**, TSCA**, WHO
 (**Enter CHEMLIST File for up-to-date regulatory information)

Absolute stereochemistry.



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

44944 REFERENCES IN FILE CA (1967 TO DATE)
 1144 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
 45008 REFERENCES IN FILE CAPLUS (1967 TO DATE)
 12 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

=> d que 147

L39 4 SEA FILE=REGISTRY 13826-64-7 OR 109-95-5 OR 13444-87-6 OR
METHYL NITRITE/CN
L41 1 SEA FILE=REGISTRY PILOT? ACID
L42 5 SEA FILE=REGISTRY L39 OR L41
L43 SEL L42 1- CHEM : 31 TERMS
L44 37753 SEA L43/BI
L45 419 SEA (L44) AND (HYPOXEM? OR HYPOXIA OR ASTHMA? OR CYSTIC FIBRO?
OR ARD OR ADULT RESPIRATORY DISTRESS OR PNEUMON? OR INTERSTITIA
L LUNG DISEASE#)
L46 287 DUP REM L45 (132 DUPLICATES REMOVED)
L47 55 SEA L46 AND HYPOXEM?

=> s 146 not 147

L48 232 L46 NOT L47

=> s 148 and patent/dt

L49 8 L48 AND PATENT/DT

=> d 1-8 bib ab

L49 ANSWER 1 OF 8 CAPLUS COPYRIGHT 2002 ACS

AN 2002:314764 CAPLUS

DN 136:319432

TI Use of aerosolized S-nitrosoglutathione in treating **cystic fibrosis**

IN Gaston, Benjamin; Stamler, Jonathan S.

PA Duke University, USA; University of Virginia Patent Foundation

SO PCT Int. Appl., 16 pp.

CODEN: PIXXD2

DT **Patent**

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI WO 2002032418	A1	20020425	WO 2001-US27768	20011015
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W: AU, CA, JP, US

RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,
PT, SE, TR

PRAI US 2000-240708P P 20001016

AB The invention discloses a compn. comprising a nitrosylating agent like
S-nitrosoglutathione for treating patients having **cystic fibrosis**.

RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L49 ANSWER 2 OF 8 CAPLUS COPYRIGHT 2002 ACS

AN 2002:107133 CAPLUS

DN 136:145232

TI Use of carbon monoxide for treating inflammation of upper airways or
bronchi

IN Lemaire, Marc; Lecourt, Laurent

PA L'Air Liquide Sante (International), Fr.

SO PCT Int. Appl., 18 pp.

CODEN: PIXXD2

DT **Patent**

LA French

FAN.CNT 1

*Quick search for patents
that have
Angelis salt, Piloty's acid,
me/et-nitrite, or Nitrosyl Bromide
+
Hypoxem?, hypox...*

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002009731	A1	20020207	WO 2001-FR2396	20010723
	W: AU, CA, JP, US, ZA				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				

	FR 2812197	A1	20020201	FR 2000-9881	20000727
PRAI	FR 2000-9881	A	20000727		

AB The invention discloses the use of carbon monoxide (CO) or a CO donor combined with at least a gas selected among nitrogen monoxide, carbon dioxide, helium, oxygen or nitrogen, and at least an active product with anti-inflammatory activity to produce a medicine for treating or preventing an acute or chronic inflammation in a human. Furthermore, the medicine may contain an addnl. gas selected among xenon, hydrogen, argon, neon, krypton, nitrogen oxide (N₂O), carbon-contg. or fluorocarbon hydrocarbons, and their mixts. The medicine is in the form of an inhalant aerosol. The inventive medicine is designed to treat any inflammatory pathol., vasoconstriction or bronchial constriction of the upper airways or of the bronchial tree, such as **asthma**, mucoviscidosis, pneumopathy and bronchial pneumopathy.

RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L49 ANSWER 3 OF 8 CAPLUS COPYRIGHT 2002 ACS

AN 2001:582316 CAPLUS

DN 135:147442

TI Treating pulmonary disorders with gaseous agent causing repletion of GSNO
IN Stamler, Jonathan S.

PA Duke University, USA

SO U.S. Pat. Appl. Publ., 7 pp., Cont.-in-part of U.S. Ser. No. 390,215.
CODEN: USXXCO

DT **Patent**

LA English

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2001012834	A1	20010809	US 2001-782077	20010214
	US 6314956	B1	20011113	US 1999-390215	19990908
PRAI	US 1999-390215	A2	19990908		

AB Pulmonary disorders in which the GSNO pool or glutathione pool in the lung is depleted and where reactive oxygen species in lung are increased, are treated by delivering into the lung as a gas, agent causing repletion or increase of the GSNO pool or protection against toxicity and does so independently of reaction with oxygen. Agents include Et nitrite, NOCl, NOBr, NOF, NOCN, N₂O₃, HNO, and H₂S. Optionally, N-acetylcysteine, ascorbate, H₂S or HNO is administered in addn. to other GSNO repleting agent to potentiate the effect of said agent.

L49 ANSWER 4 OF 8 CAPLUS COPYRIGHT 2002 ACS

AN 1999:104532 CAPLUS

DN 130:158426

TI Stabilized microbubbles for enhancing transport of gases to tissues
IN Van Liew, Hugh D.; Burkard, Mark E.; Lundgren, Clas E. G.; Tyssebotn, Ingvald M.

PA Research Foundation of State University of New York, USA

SO U.S., 31 pp.

CODEN: USXXAM

DT **Patent**

LA English

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5869538	A	19990209	US 1996-753581	19961126
	US 6127428	A	20001003	US 1999-246239	19990208
PRAI	US 1996-753581	A2	19961126		

AB Disclosed are methods of using stabilized microbubbles, such as those formulated from slowly permeating gas, to deliver or remove from tissue at least one gas selected from a respiratory gas, anesthetic gas, inert gas, or toxic gas. The methods comprise introducing, into the blood circulation of an individual to be treated, a therapeutically effective amt. of the stabilized microbubbles. The methods are based on using the inherent phys. properties of the blood circulation, of the microbubbles, and of the gases. The methods are esp. useful for enhancing transport of oxygen in applications or conditions such as blood loss, anemia, organ perfusion, coronary Angioplasty, venous to arterial shunting of blood, oxygenation of ischemic tissues resulting from vascular obstructions, and oxygenation of solid tumor tissues in anticancer therapy. Stabilized microbubbles were administered to the rats in the form of an emulsion of liq. droplets of dodecafluoropentane, wherein at body temp., the liq. droplets became gas microbubbles. The microbubbles increased the arterial Po2 and lasted in the body for an h or more.

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L49 ANSWER 5 OF 8 CAPLUS COPYRIGHT 2002 ACS

AN 1998:682105 CAPLUS

DN 129:298408

TI Nitrosylation to inactivate apoptotic enzymes, and therapeutic caspase-like peptide

IN Lipton, Stuart A.; Troy, Carol M.

PA The Children's Medical Center Corp., USA

SO PCT Int. Appl., 20 pp.

CODEN: PIXXD2

DT **Patent**

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9843621	A1	19981008	WO 1998-US6287	19980331
	W: CA, JP				
	RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	EP 979073	A1	20000216	EP 1998-913316	19980331
	R: DE, ES, FR, GB, IT				
	JP 2001518096	T2	20011009	JP 1998-541915	19980331
PRAI	US 1997-42144P	P	19970331		
	WO 1998-US6287	W	19980331		

OS MARPAT 129:298408

AB S-nitrosylation (reaction of nitric oxide [NO] species with crit. cysteine sulphydryl groups of a caspase [RS] to form RS-NO) inhibits caspase activity and thereby ameliorates apoptosis not only in neuronal cells, but also in other tissues. Addnl., ICE-like (caspase-like) sequence ICARG is used to protect from excitotoxic neuronal damage and neurol. as well as non-neurol. and non-ophthalmol. indications characterized by undesired apoptosis.

L49 ANSWER 6 OF 8 CAPLUS COPYRIGHT 2002 ACS

AN 1998:163462 CAPLUS

DN 128:213395

TI Anti-inflammatory hydrogenous medicament
IN Eschwey, Manfred; Krebs, Christian; Van Bonn, Rolf; Germann, Peter
PA Messer Griesheim G.m.b.H., Germany; Eschwey, Manfred; Krebs, Christian;
Van Bonn, Rolf; Germann, Peter
SO PCT Int. Appl., 28 pp.
CODEN: PIXXD2

DT **Patent**
LA German

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9808523	A1	19980305	WO 1997-EP4567	19970822
	W: BG, BR, CA, CN, CZ, HU, JP, NO, PL, SI, SK, TR, US				
	RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	DE 19634530	A1	19980305	DE 1996-19634530	19960827
	DE 19734279	A1	19990211	DE 1997-19734279	19970807
	EP 921807	A1	19990616	EP 1997-944778	19970822
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	CN 1228706	A	19990915	CN 1997-197517	19970822
	JP 2000517311	T2	20001226	JP 1998-511253	19970822
	ZA 9707669	A	19980223	ZA 1997-7669	19970826
PRAI	DE 1996-19634530	A	19960827		
	DE 1997-19734279	A	19970807		
	WO 1997-EP4567	W	19970822		

AB Hydrogenous gas mixts. are provided which are suitable for prep. medicaments for treating inflammatory processes in humans and mammals, esp. in the lungs. 2H-contg. gas mixts. are used for treating cancer. In addn. to H₂, the hydrogenous gas mixts. can contain a pharmacol. active gas, such as NO, CO, N₂O, C₂H₂, or C₂H₄. H₂ enhances O₂ exchange in the lung and increases the effectiveness of NO in inhalation therapy of lung diseases. The hydrogenous medicament is used as an inhalant gas, in the form of suppositories, ointments, solns., dispersions, emulsions, microdroplets, microbubbles, liposomes, microparticles, aerosols, foams, particulate agents, pills, pastilles, capsules, microcapsules, chewing-gum, in carriers, or as part of a plaster. Thus, oleic acid-induced respiratory distress in sheep was prevented by prior treatment with a gas mixt. contg. O₂ 50, H₂ 3.6, and N₂ 46.4 vol.%.

L49 ANSWER 7 OF 8 CAPLUS COPYRIGHT 2002 ACS
AN 1993:52423 CAPLUS
DN 118:52423
TI Methylthioribose kinase inhibitors as antimicrobial agents
IN Riscoe, Michael K.; Tower, Paula A.; Fitchen, John H.; Ferro, Adolph J.
PA Oregon Health Sciences University, USA; Oregon State University
SO PCT Int. Appl., 17 pp.
CODEN: PIXXD2
DT **Patent**
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9218118	A1	19921029	WO 1992-US3094	19920415
	W: CA, JP, US				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE				
PRAI	GB 1991-8348		19910418		
OS	MARPAT 118:52423				
AB	The title compns. (Markush included), e.g. trifluoromethylthioribose, (I)				

and inhibitors of de novo methionine synthesis (1,2,4-triazole, azaserine or propargylglycine) are antimicrobial agents. I inhibited growth of *Klebsiella pneumoniae* at 1.mu.M and its action was completely inhibited by 1000.mu.M methionine.

L49 ANSWER 8 OF 8 WPIDS (C) 2002 THOMSON DERWENT

AN 1998-362916 [31] WPIDS

DNN N1998-283294 DNC C1998-111760

TI Performing primary calibration of spectrometer - comprises calculating theoretical spectral response function for series of candidate chemical substance and relating this to specific instrument.

DC B04 E36 J04 K08 S03

IN ESLER, M B; GRIFFITH, D W T

PA (UYWO-N) UNIV WOLLONGONG

CYC 82

PI WO 9827416 A1 19980625 (199831)* EN 44p

RW: AT BE CH DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA
PT SD SE SZ UG ZW

W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE
GH GM GW HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG
MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG
US UZ VN YU ZW

CA 2194110 A 19980630 (199842)#

AU 9853952 A 19980715 (199846)

US 5838008 A 19981117 (199902)#

EP 1007946 A1 20000614 (200033) EN

R: AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

JP 2001506753 W 20010522 (200134) 44p

AU 738477 B 20010920 (200164)

ADT WO 9827416 A1 WO 1997-AU850 19971217; CA 2194110 A CA 1996-2194110
19961230; AU 9853952 A AU 1998-53952 19971217; US 5838008 A US 1996-770739
19961218; EP 1007946 A1 EP 1997-947655 19971217, WO 1997-AU850 19971217;
JP 2001506753 W WO 1997-AU850 19971217, JP 1998-527114 19971217; AU 738477
B AU 1998-53952 19971217

FDT AU 9853952 A Based on WO 9827416; EP 1007946 A1 Based on WO 9827416; JP
2001506753 W Based on WO 9827416; AU 738477 B Previous Publ. AU 9853952,
Based on WO 9827416

PRAI AU 1996-4258 19961218; CA 1996-2194110 19961230; US 1996-770739
19961218

AB WO 9827416 A UPAB: 19980805

A primary calibration of a spectrometer is performed by first calculating a theoretical spectral response function for a series of candidate chemicals. This function is convolved with a spectrometer instrument response function corresponding to the specific spectrometer to produce an expected response function for the series of chemicals. The expected response function is used to calibrate the spectrometer in the subsequent measurement of chemical substances.

USE - The method uses Fourier Transform Infrared Spectroscopy to measure gas concentrations and ratios of concentration, especially isotope ratios. The method may be used to determine the concentration of trace gases in e.g. air, breath, combustion products and landfill gases. The method may be used to measure e.g. the ratio of ¹²C to ¹³C isotopes in CO₂; ¹³C-lactose breath test for diagnosing carbohydrate malabsorption (lactose malabsorption causes diarrhoea and abdominal complaints); ¹³C triolein breath test for diagnosing and monitoring fat malabsorption due to disease of the pancreas, especially in patients with **cystic fibrosis**; ¹³C-glycocholic acid breath test for assessing bile acid metabolism connected with cancer of the large bowel; and ¹³C-aminopyrine breath test in the diagnosis of liver function. Other trace gases measured

include CH₄, CO, **N₂O**, H₂O, NH₃, SO₂, H₂S, O₃, C₂H₂, C₂H₆, SF₆,
CH₃COCH₃, CH₂O and their isotopomers.

ADVANTAGE - The method provides a more accurate and precise
measurement of concentrations of trace gases than previously achieved.
Dwg.0/6

=>

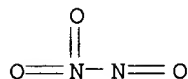
3 Claimed A.I.

RN 2696-92-6 REGISTRY
CN Nitrosyl chloride ((NO)Cl) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Nitrosyl chloride (8CI)
OTHER NAMES:
CN Chlorine nitride oxide (ClNO)
CN Nitrogen oxide chloride (NOCl)
CN Nitrogen oxychloride
CN Nitrogen oxychloride (NOCl)
CN **Nitrosochloride**
CN Nitrosonium chloride
FS 3D CONCORD
DR 74734-38-6
MF Cl N O
CI COM
LC STN Files: AGRICOLA, BIOBUSINESS, BIOSIS, CA, CAOLD, CAPLUS, CASREACT,
CHEMINFORMRX, CHEMLIST, CSChem, CSNB, DETHERM*, DIPPR*, ENCOMPLIT,
ENCOMPLIT2, ENCOMPPAT, ENCOMPPAT2, GMELIN*, HSDB*, IFICDB, IFIPAT,
IFIUDB, MEDLINE, MRCK*, MSDS-OHS, NIOSHTIC, PDLCOM*, PIRA, PROMT,
SPECINFO, TOXCENTER, USPATFULL, VTB
(*File contains numerically searchable property data)
Other Sources: EINECS**, NDSL**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)

Cl-N=O

Claimed A.I.

RN 10544-73-7 REGISTRY
CN Nitrogen oxide (N2O3) (8CI, 9CI) (CA INDEX NAME)
OTHER NAMES:
CN asym-Dinitrogen trioxide
CN Dinitrogen trioxide
CN Nitrogen sesquioxide
CN Nitrogen trioxide
CN Nitrogen trioxide (N2O3)
CN Nitrous anhydride
FS 3D CONCORD
DR 16529-92-3, 96607-26-0, 51974-74-4, 91913-71-2
MF N2 O3
CI COM
LC STN Files: AGRICOLA, BIOBUSINESS, BIOSIS, CA, CANCERLIT, CAOLD, CAPLUS,
CASREACT, CEN, CHEMINFORMRX, CHEMLIST, CIN, CSCHEM, CSNB, DETHERM*,
DIPPR*, IFICDB, IFIPAT, IFIUDB, MEDLINE, MSDS-OHS, NIOSHTIC, PIRA,
TOXCENTER, USPATFULL
(*File contains numerically searchable property data)
Other Sources: EINECS**, NDSL**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

RN 7783-06-4 REGISTRY
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)
OTHER NAMES:
CN Dihydrogen monosulfide
CN Dihydrogen sulfide
CN Hydrogen sulfide
CN Hydrosulfuric acid
CN Stink damp
CN Sulfur dihydride
CN Sulfur hydride
CN Sulfur hydride (SH2)
CN Sulfureted hydrogen
FS 3D CONCORD
DR 11144-15-3
MF H2 S
CI COM
LC STN Files: AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CABA, CANCERLIT, CAPLUS, CASREACT, CBNB, CEN, CHEMCATS, CHEMINFORMRX, CHEMLIST, CHEMSAFE, CIN, CSCHM, CSNB, DETHERM*, DIPPR*, EMBASE, ENCOMPLIT, ENCOMPLIT2, ENCOMPPAT, ENCOMPPAT2, GMELIN*, HSDB*, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*, MSDS-OHS, NAPRALERT, NIOSHTIC, PDLCOM*, PIRA, PROMT, RTECS*, SPECINFO, TOXCENTER, TULSA, ULIDAT, USPAT2, USPATFULL, VTB
(*File contains numerically searchable property data)
Other Sources: DSL**, EINECS**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)

H2S

35489 REFERENCES IN FILE CA (1967 TO DATE)
176 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
35513 REFERENCES IN FILE CAPLUS (1967 TO DATE)

=>

AN 2001:586709 CAPLUS
DN 135:261418
TI Ambient and human sources of **hydrogen sulfide**: an explosive topic
AU Lambert, Charles E.; Winegar, Eric D.; Fox, Phyllis
CS McDaniel Lambert, Inc., Venice, CA, 90291, USA
SO Proceedings of the Air & Waste Management Association's Annual Conference & Exhibition, 93rd, Salt Lake City, UT, United States, June 18-22, 2000 (2000), 4502-4507 Publisher: Air & Waste Management Association, Pittsburgh, Pa.
CODEN: 69BMLL
DT Conference; General Review; (computer optical disk)
LA English
RE.CNT 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT
TI Ambient and human sources of **hydrogen sulfide**: an explosive topic
AB **Hydrogen sulfide (H₂S)** has been a chem. of concern for many years, but over the last several years interest has greatly increased. Both state and federal agencies have been under const. pressure from various labor and environmental groups to lower community and worker exposure limits. In addn., numerous lawsuits have been filed alleging a range of health effects from low level H₂S exposure, including **asthma**, nausea, headaches, and insomnia. Most recently there has been a significant lobbying effort to get H₂S recognized by the US EPA as a hazardous air pollutant. One of the major reasons for this push is the belief that chronic exposure to low concns. of **hydrogen sulfide** can cause irreversible damage to the brain and central nervous system. This conclusion is based on very weak epidemiol. studies with extremely poor exposure data. The most recent neurobehavioral animal studies have not supported this conclusion. Based on preliminary data from both our own field measurements and selected literature data, it appears as if biogenic and other natural sources far exceed industrial contributions. In an ongoing study of a rural community on the Central Coast of California we have found av. ambient concns. of approx. 2.0 ppb, three times the US EPA RfC (ref. level used for risk and hazard assessments) of 0.7 ppb. Human breath measurements of area residents have averaged 48 ppb. This study was completed to support one of the largest community monitoring plans ever undertaken for a petroleum remediation site. The information on ambient as well as human breath concns. was used very effectively in communications with the local community and environmental agencies. Historical and current data gathered in the study demonstrate that: (1) low ambient concns. are ubiquitous and not restricted to downwind of industrial sources, (2) natural and biogenic sources predominate, (3) given the rapid metab. and detoxification as well as ubiquity of endogenous H₂S, it is not a human toxin at low concns., (4) HAP designation is unnecessary and not warranted, (5) current State and Federal safe exposure levels (RfC) are too conservative, and (6) current worker exposure limits are appropriate and sufficiently health protective.

AN 2002:951221 CAPLUS
 DN 138:202707
 TI Inhibition of human surfactant protein A function by oxidation intermediates of nitrite
 AU Davis, Ian C.; Zhu, Sha; Sampson, Jacinda B.; Crow, John P.; Matalon, Sadis
 CS Department of Anesthesiology, University of Alabama at Birmingham, Birmingham, AL, USA
 SO Free Radical Biology & Medicine (2002), 33(12), 1703-1713
 CODEN: FRBMEH; ISSN: 0891-5849
 PB Elsevier Science Inc.
 DT Journal
 LA English
 AB Nitration of protein tyrosine residues by **peroxynitrite** (ONOO-) has been implicated in a variety of inflammatory diseases such as acute **respiratory distress syndrome** (ARDS). Pulmonary surfactant protein A (SP-A) has multiple functions including host defense. We report here that a mixt. of hypochlorous acid (HOCl) and nitrite (NO₂⁻) induces nitration, oxidn., and chlorination of tyrosine residues in human SP-A and inhibits SP-A's ability to aggregate lipids and bind mannose. Nitration and oxidn. of SP-A was not altered by the presence of lipids, suggesting that proteins are preferred targets in lipid-rich mixts. such as pulmonary surfactant. Moreover, both horseradish peroxidase and myeloperoxidase (MPO) can utilize NO₂⁻ and hydrogen peroxide (H₂O₂) as substrates to catalyze tyrosine nitration in SP-A and inhibit its lipid aggregation function. SP-A nitration and oxidn. by MPO is markedly enhanced in the presence of physiol. concns. of Cl⁻ and the lipid aggregation function of SP-A is completely abolished. Collectively, our results suggest that MPO released by activated neutrophils during inflammation utilizes physiol. or pathol. levels of NO₂⁻ to nitrate proteins, and may provide an addnl. mechanism in addn. to ONOO⁻ formation, for tissue injury in ARDS and other inflammatory diseases assocd. with upregulated .bul.NO and oxidant prodn.

AN 2001182755 MEDLINE
 DN 21109287 PubMed ID: 11179131
 TI Nitric oxide and nitrotyrosine in the lungs of patients with acute respiratory distress syndrome.
 CM Comment in: Am J Respir Crit Care Med. 2001 Feb;163(2):308-10
 AU Sittipunt C; Steinberg K P; Ruzinski J T; Myles C; Zhu S; Goodman R B; Hudson L D; Matalon S; Martin T R
 CS Harborview Medical Center, Division of Pulmonary and Critical Care Medicine, University of Washington School of Medicine, Medical Research Service of the Seattle Department of Veterans Affairs Medical Center, Seattle, Washington 98108, USA.
 NC AI-29103 (NIAID)
 GM-37696 (NIGMS)
 HL-30542 (NHLBI)
 HL-31197 (NHLBI)
 HL-51173 (NHLBI)
 SO AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE, (2001 Feb) 163 (2) 503-10.
 Journal code: 9421642. ISSN: 1073-449X.
 CY United States
 DT Journal; Article; (JOURNAL ARTICLE)
 LA English
 FS Abridged Index Medicus Journals; Priority Journals
 EM 200103
 ED Entered STN: 20010404
 Last Updated on STN: 20010404
 Entered Medline: 20010329
 AB Nitric oxide (NO) end-products (nitrate and nitrite) are present in bronchoalveolar lavage (BAL) fluid of patients with inflammatory lung diseases. Reactive oxygen-nitrogen intermediates damage macromolecules by oxidation or nitration of critical residues in proteins. The goal of this study was to measure NO end-products (nitrate+ **nitrite**), in BAL fluid before and after the onset of acute **respiratory distress syndrome** (ARDS) and to determine if these products are associated with expression of inducible nitric oxide synthase enzyme (iNOS) in BAL cells and nitration of BAL proteins. We performed bronchoalveolar lavage (BAL) in patients at risk for ARDS (n = 19), or with ARDS (n = 41) on Days 1, 3, 7, 14, and 21 after onset, and measured total nitrite (after reducing nitrate to nitrite) and protein-associated nitrotyrosine concentration in each BAL fluid sample. Cytospin preparations of BAL cells were analyzed by immunocytochemistry for iNOS and nitrotyrosine. Nitrate+nitrite were detected in BAL fluid from patients at risk for ARDS, and for as long as 21 d after the onset of ARDS. Nitrotyrosine was detectable in all BAL fluid samples for as long as 14 d after the onset of ARDS (range, 38.8 to 278.5 pmol/mg of protein), but not in BAL of normal volunteers. Alveolar macrophages of patients with ARDS were positive for iNOS and nitrotyrosine, and remained positive for as long as 14 d after onset of ARDS. The BAL nitrate+nitrite did not predict the onset of ARDS, but the concentration was significantly higher on Days 3 and 7 of ARDS in patients who died. Thus, NO end products accumulate in the lungs before and after onset of ARDS; iNOS is expressed at high levels in AM during ARDS; and nitration of intracellular and extracellular proteins occurs in the lungs in ARDS. The data support the concept that NO-dependent pathways are important in the lungs of patients before and after the onset of ARDS.

Background

AN 2001:695475 CAPLUS
DN 136:245117
TI Nitric oxide and DNA damage
AU Coban, Ahmet Yilmaz; Durupinar, Belma
CS Tip Fakultesi Mikrobiyoloji ve Klinik Mikrobiyoloji Anabilim Dalı, Ondokuz
Mayis Universitesi, Turk.
SO Mikrobiyoloji Bulteni (2001), 35(3), 497-504
CODEN: MIBUBI; ISSN: 0374-9096
PB Ankara Mikrobiyoloji Dernegi
DT Journal; General Review
LA Turkish
AB A review. Nitric oxide (NO) which is a very popular mol. in recent years,
is a sol., free radical gas. NO is secreted by several cells such as
endothelial cells, macrophages and some special brain neurons, and
synthesized by the help of nitric oxide synthase enzyme from L-arginine,
mol. oxygen and NADPH. There are various effects of NO on the organ and
immune systems of the host, including **vasodilation**, platelet
aggregation and adhesion, and macrophage derived form of NO exerts some
cytotoxic effects on some microorganisms and tumor cells. NO is produced
in high concns. during chronic inflammation and after being transformed to
nitrogen dioxide, **dinitrogen trioxide** and nitrite in
the presence of mol. oxygen, it produces important genomic damage such as
base pair replacement mutations and breaks in the DNA helix. In this
review article, the characteristics, mechanisms of synthesis and the
functions of nitric oxide has been reviewed and the effects of NO on DNA
have been discussed under the light of literature.

AN 2002:863491 CAPLUS
 DN 138:120791
 TI Reactive Oxygen Nitrogen Species Decrease Cystic Fibrosis Transmembrane
 Conductance Regulator Expression and cAMP-mediated Cl⁻ Secretion in Airway
 Epithelia
 AU Bebok, Zsuzsa; Varga, Karoly; Hicks, James K.; Venglarik, Charles J.;
 Kovacs, Timea; Chen, Lan; Hardiman, Karin M.; Collawn, James F.; Sorscher,
 Eric J.; Matalon, Sadis
 CS Departments of Medicine, Anesthesiology, The Gregory Fleming James Cystic
 Fibrosis Research Center, University of Alabama, Birmingham, AL, 35233,
 USA
 SO Journal of Biological Chemistry (2002), 277(45), 43041-43049
 CODEN: JBCHA3; ISSN: 0021-9258
 PB American Society for Biochemistry and Molecular Biology
 DT Journal
 LA English
 AB The authors investigated putative mechanisms by which nitric oxide
 modulates cystic fibrosis transmembrane conductance regulator (CFTR)
 expression and function in epithelial cells. Immunopptn. followed by
 Western blotting, as well as immunocytochem. and cell surface
 biotinylation measurements, showed that incubation of both stably
 transduced (HeLa) and endogenous CFTR expressing (16HBE14o-, Calu-3, and
 mouse tracheal epithelial) cells with 100 .mu.m diethylenetriamine NONOate
 (DETA NONOate) for 24-96 h decreased both intracellular and apical CFTR
 levels. Calu-3 and mouse tracheal epithelial cells, incubated with DETA
 NONOate but not with 100 .mu.m 8-bromo-cGMP for 96 h, exhibited reduced
 cAMP-activated short circuit currents when mounted in Ussing chambers.
 Exposure of Calu-3 cells to nitric oxide donors resulted in the nitration
 of a no. of proteins including CFTR. Nitration was augmented by
 proteasome inhibition, suggesting a role for the proteasome in the degrdn.
 of nitrated proteins. Our studies demonstrate that levels of nitric oxide
 that are likely to be encountered in the vicinity of airway cells during
 inflammation may nitrate CFTR resulting in enhanced degrdn. and decreased
 function. Decreased levels and function of normal CFTR may account for
 some of the cystic fibrosis-like symptoms that occur in chronic
 inflammatory lung diseases assocd. with increased NO prodn.

AN 2002:297662 CAPLUS
 DN 137:273028
 TI Effects of inducible nitric oxide synthase and xanthine oxidase inhibitors on SEB-induced interstitial pneumonia in mice
 AU Miyakawa, H.; Sato, K.; Shinbori, T.; Okamoto, T.; Gushima, Y.; Fujiki, M.; Suga, M.
 CS First Dept of Internal Medicine, Kumamoto University School of Medicine, Kumamoto, 860-0811, Japan
 SO European Respiratory Journal (2002), 19(3), 447-457
 CODEN: ERJOEI; ISSN: 0903-1936
 PB European Respiratory Society
 DT Journal
 LA English
 AB The authors have previously reported that intratracheal instillation of staphylococcal enterotoxin-B (SEB) induced interstitial pneumonia (IP) in autoimmune-prone mice. SEB-reactive T-cells were critically involved in the development of IP in this model. Concern has arisen about the hazards of reactive oxygen species (ROS) and reactive nitrogen species (RNS) in the process of lung injury and fibrosis. Therefore, the involvement of nitric oxide (NO) and superoxide anion (O₂⁻) in the pathogenesis of IP in this autoimmune-prone model has been investigated. Nitrite/nitrate levels were increased in bronchoalveolar lavage (BAL) fluid and serum from SEB-injected mice. The signal of the NO-(N-(dithiocarboxy)sarcosine)₂-Fe²⁺ complex was detected in the SEB-injected lung and whole blood by ESR (EPR) spectroscopy. NO prodn. was significantly decreased by aminoguanidine (AG) treatment. Xanthine oxidase (XO) activity in the lung, BAL fluid, and plasma was increased with instillation of SEB, and 4-amino-6-hydroxypyrazolo(3,4-d)-pyrimidine (AHPP) significantly inhibited XO activity. Moreover, both AG and AHPP significantly decreased prodn. of pro-inflammatory cytokines, nos. of infiltrated cells in BAL fluid, and the area of thickened alveolar septa in the SEB-injected lung. In conclusion, the overprodn. of nitric oxide and super oxide anion were implicated in the pathogenesis of interstitial pneumonia, and inducible nitric oxide synthase and xanthine oxidase inhibitors had protective effects against interstitial pneumonia in this model.

AN 2000:65629 TOXCENTER
DN 20307080 PubMed ID: 10850907
TI Hydrogen sulfide inhalation injury
AU van Aalst J A; Isakov R; Polk J D; Van Antwerp A D; Yang M; Fratianne R B
CS Case Western Reserve University, MetroHealth Medical Center, Cleveland,
Ohio, USA
SO JOURNAL OF BURN CARE AND REHABILITATION, (2000 May-Jun) 21 (3) 248-53.
Journal Code: 8110188. ISSN: 0273-8481.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
FS MEDLINE
OS MEDLINE 2000496227
LA English
ED Entered STN: 20011116
Last Updated on STN: 20011116
AB Hydrogen sulfide is a colorless, noxious gas with the distinctive smell of
rotten eggs. This compound is a powerful reducing agent that is
encountered in a number of industrial processes. When **hydrogen
sulfide** is present, it exposes workers to the potentially lethal
effects of the rapid **hypoxemia** that results from exposure to
this agent. The "warning sign" is the characteristic smell of rotten
eggs; this smell should alert anyone in the area that a potentially
serious risk exists. The immediate removal of the victim and
administration of high-flow oxygen is essential. Neurologic sequelae may
require anticonvulsants and care must be exercised to observe for cardiac,
hepatic, and renal insufficiency. Depending on the concentration,
hydrogen sulfide can rapidly overcome a potential victim.

AN 2000496227 MEDLINE
DN 20307080 PubMed ID: 10850907
TI Hydrogen sulfide inhalation injury.
AU van Aalst J A; Isakov R; Polk J D; Van Antwerp A D; Yang M; Fratianne R B
CS Case Western Reserve University, MetroHealth Medical Center, Cleveland,
Ohio, USA.
SO JOURNAL OF BURN CARE AND REHABILITATION, (2000 May-Jun) 21 (3) 248-53.
Journal code: 8110188. ISSN: 0273-8481.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals; Nursing Journals
EM 200010
ED Entered STN: 20001027
Last Updated on STN: 20001027
Entered Medline: 20001019
AB Hydrogen sulfide is a colorless, noxious gas with the distinctive smell of rotten eggs. This compound is a powerful reducing agent that is encountered in a number of industrial processes. When **hydrogen sulfide** is present, it exposes workers to the potentially lethal effects of the rapid **hypoxemia** that results from exposure to this agent. The "warning sign" is the characteristic smell of rotten eggs; this smell should alert anyone in the area that a potentially serious risk exists. The immediate removal of the victim and administration of high-flow oxygen is essential. Neurologic sequelae may require anticonvulsants and care must be exercised to observe for cardiac, hepatic, and renal insufficiency. Depending on the concentration, hydrogen sulfide can rapidly overcome a potential victim.

AN 1989:167691 CAPLUS
DN 110:167691
TI Peracute toxic effects of inhaled hydrogen sulfide and injected sodium hydrosulfide on the lungs of rats
AU Lopez, Alfonso; Prior, Michael G.; Reiffenstein, R. J.; Goodwin, Lorne R.
CS Anim. Sci. Wing, Alberta Environ. Cent., Vegreville, AB, T0B 4L0, Can.
SO Fundamental and Applied Toxicology (1989), 12(2), 367-73
CODEN: FAATDF; ISSN: 0272-0590
DT Journal
LA English
AB Whether i.p. injected sodium hydrosulfide (NaHS) would mimic the pulmonary alterations induced by lethal peracute exposure to an atm. contg. H₂S was studied. Groups of five Sprague-Dawley rats were exposed to an atm. of either 2317.6 \pm 547.3 mg m⁻³ H₂S (H₂S group) or no H₂S (air group), or were injected i.p. with a soln. contg. 30 mg kg⁻¹ sodium hydrosulfide (NaHS group) or saline soln. (vehicle control). Rats of the air and saline groups were killed by cervical dislocation. All rats exposed to H₂S or injected with NaHS died within 3 min; however, only rats exposed to H₂S showed severe **respiratory distress** in the agonic phase preceding death. In addn., rats in the H₂S group had a notable discharge of serous fluid from the mouth and nostrils. At necropsy, all rats in the H₂S group had gross and histol. evidence of pulmonary edema characterized by massive extravasation of eosinophilic fluid into the bronchoalveolar space. In contrast, the lungs of rats injected with NaHS or saline or exposed to air were unaffected. Thus, the edematogenic effect of H₂S in the lungs cannot be reproduced by injection of NaHS. The severity of lung edema induced by a peracute exposure to H₂S was extensive enough to account for death.